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CLAIMS

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[Claim(s)]

[Claim 1] The cup member of the shape of a semi-sphere which equipped the bottom with the hole mostly, and a pillar section with a path smaller than the path of this hole inserted in the hole of said cup member, The engagement section which consists of the omission prevention section for preventing omission from this hole is the member of the shape of an outside partial ball mostly prolonged from the bottom. it having two or more stomata mostly formed in the core at spacing about 1 law in said engagement section, and with the attachment component which has a path smaller than the path of said cup member The corpuscle member held at two or more stomata of this attachment component, and the ball member which supported to said two or more corpuscle member, and the part has exposed from opening of the circle configuration of said attachment component in said attachment component, since -- the one spot bearing characterized by said attachment component and ball member rocking along with the spherical surface of said cup member according to the load concerning said ball.

[Claim 2] One spot bearing according to claim 1 characterized by said hole of said cup member being almost circular.

[Claim 3] One spot bearing according to claim 1 characterized by being a long hole with said hole of said cup member long to an one direction.

[Claim 4] One spot bearing according to claim 1 to which the diameter of min of opening of said circle configuration of said attachment component is characterized by being smaller than the overall diameter of said said ball.

[Claim 5] One spot bearing according to claim 1 by which it is forming [ in the part where said attachment component and said cup member meet ]-, respectively-almost flat concurrency part for preventing said attachment component turning characterized.

[Claim 6] Electronic intelligence equipment characterized by having the member rocked by actuation of this one spot bearing while having one spot bearing according to claim 1.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to suitable one spot bearing to change the include angle of the mirror to which the path of the light in the electronic intelligence equipment using various kinds of optical media is changed.

[0002]

[Description of the Prior Art] The development of electronic information machines and equipment using optical media, such as a compact disk (CD) in recently, CD-ROM (lead-on memory), or an optical MAG (MO) disk, is \*\*\*\* better \*\*. If these roughly classify, the electronic information machines and equipment using CD and the laser disc (LD) only for playbacks which stores the information which is not erased, and a fixed period need to be saved, and it will become three kinds of the types of the electronic information machines and equipment using WO (write-once) disk and CD-R (CD recorder bull) for 1 time record repeat playback which stores the information which is not eliminable accidentally, and the electronic information machines and equipment using the MO disk and the mini disc (MD) which can carry out repeat write-in playback.

[0003] Also in which [ these ] electronic information machines and equipment, it has the optical pickup device in which the information stored in each disk is read optically, and this optical pickup device consists of a mirror for scanning the light source like the light emitting diode which generates the light for generally reading the information on a disk optically, or a laser diode, and its beam of light. One spot bearing as shown in drawing 4 is used for the servo DORABU device in which the mirror is driven, as an optical pickup carrier.

[0004] By drawing 4 , if such conventional one spot bearing is explained, many corpuscle members 2 will be mutually contacted at the pars basilaris ossis occipitalis of the semi-sphere-like cup member 1, it will arrange, one quite bigger ball 3 than the path of the corpuscle member 2 will be carried on them, and flange 7A of the cover member 7 will be welded to flange 1A of the cup member 1. The cover member 7 has opening 7B of a circle configuration, and head part 3A of a ball 3 exposes it from opening 7B. Where the mirror which is not illustrated to head part 3A of the ball 3 or the mirror support plate is supported at one spot in the electronic intelligence equipment of a certain kind of optical medium use and a load is covered in the direction Y of AKISHIARU When a ball 3 rotates according to external

force within the limits of a fixed include angle (about \*\*15 degrees), the mirror which is in contact with the ball 3 by one point, or a mirror support plate rocks to right and left or order with small torque.

[0005]

[Problem(s) to be Solved by the Invention] However, at one spot bearing with such structure, since vibration of a proper occurs by interference of corpuscle member 2 comrades, there is a fault of giving minute vibration to driven members, such as a mirror member.

[0006] moreover, the effect of Chile which the fixed approach of the cup member 1 and the cover member 7 is difficult, for example, generates in spot welding at the time of welding, and a heart gap -- rocking actuation of one spot bearing -- un-smooth \*\* -- being easy -- \*\* -- there is a problem to say.

[0007] Furthermore, since it changes the cup member 1 and the cover member 7 into the condition near seal, there is also a fault that washing and oil supply after an assembly are difficult.

[0008] While this invention solves such all conventional troubles, an assembly is easily possible and it aims at offering the electronic intelligence equipment using cheap one spot bearing and cheap it.

[0009]

[Means for Solving the Problem] In order to solve the above problems, the 1st invention The cup member of the shape of a semi-sphere which equipped the bottom with the hole mostly, and a pillar section with a path smaller than the path of this hole inserted in the hole of said cup member, The engagement section which consists of the omission prevention section for preventing omission from this hole is the member of the shape of an outside partial ball mostly prolonged from the bottom. The attachment component which has two or more stomata mostly formed in the core at fixed spacing in said engagement section, and has a path smaller than the path of the cup member of the shape of said semi-sphere, It supports to said two or more corpuscle member in the corpuscle member held at two or more stomata of this attachment component, and said attachment component. It consists of a ball member which the part has exposed from opening of the circle configuration of said attachment component, and the one spot bearing characterized by said attachment component and ball member rocking along with the spherical surface of said cup member according to the load concerning said ball is offered.

[0010] In order to solve the above problems, the 2nd invention offers the one spot bearing according to claim 1 characterized by said hole of said cup member being almost circular.

[0011] In order to solve the above problems, the 3rd invention offers the one spot bearing according to claim 1 characterized by being a long hole with said hole of said cup member long to an one direction.

[0012] In order to solve the above problems, the 4th invention offers the one spot bearing according to claim 1 to which the diameter of min of opening of said circle configuration of said ball attachment component is characterized by being smaller than the overall diameter of said said ball.

[0013] In order to solve the above problems, the 5th invention offers the one spot bearing according to claim 1 by which it is forming [ in the part where said ball attachment component and said cup member meet ]-, respectively-almost flat concurrency part for preventing said ball attachment component turning characterized.

[0014] In order to solve the above problems, the 6th invention offers the electronic intelligence equipment characterized by having the member rocked by actuation of this one spot bearing while having one spot bearing according to claim 1.

[0015]

[The gestalt and example] for inventing A drawing explains each example of this invention below. In drawing 1 (A) which shows the cross section (Rhine X-X') of this one spot bearing, and drawing 1 (B) seen from the cup member bottom, the same notation as the notation shown by drawing 3 shall show a corresponding member.

[0016] While not having a free wheel plate unlike the conventional thing, but replacing with a cover and holding the both sides of a few corpuscle members and one ball by the attachment component, the description of this one spot bearing makes that attachment component engage with hole 1B of the cup member 1, and it is made to rock it.

[0017] The cup member 1 is the thing of the shape of a semi-sphere which consists of a metallic material, and has hole 1B of a circle configuration at the pars basilaris ossis occipitalis. The attachment component 4 which consists of a synthetic-resin ingredient is carrying out the configuration of the shape of a partial ball with an outer diameter smaller than the bore of the cup member 1, and has engagement section 4A prolonged along with the medial-axis line Y from the external surface, and hole 4B for holding the corpuscle member 2. Moreover, an attachment component 4 puts in a ball 3 and has opening 4C a ball does not have dedropping simply after that.

[0018] Engagement section 4A consists of a pillar section four A1 and the omission prevention section four A2 formed at the tip. A pillar section four A1 has die length with it rather than hole 1B of the cup member 1 in extent which can be rocked within hole 1B of a circle configuration. [ than the thickness of the cup member 1 ] [ a small and path and ] [ larger ] The path is large rather than the path of hole 1B of the cup member 1, and once engagement section 4A is fitted in hole 1B of the cup member 1, it escapes from the part of the overall diameter of the omission prevention section four A2 simply by the omission prevention section four A2. Moreover, in order that three hole 4B may hold three corpuscle members 2, it is symmetrical with the

medial-axis line Y, and it has it at equal intervals mostly. Although five or more pieces are sufficient as hole 4B and the corpuscle member 2, from the field of cost, three pieces or four pieces are desirable. Moreover, opening 4C is the configuration which has one or more projections which make the part of the narrowest width of face of circular [ desirable / with a path smaller than a ball 3 / a little ], or opening 4C smaller than a ball 3 a little.

[0019] The assembly of this one spot bearing is very easy, is in the condition of having made the corpuscle member 2 holding to three hole 4B of an attachment component 4, respectively, doubles engagement section 4A of an attachment component 4 with hole 1B of the cup member 1, and gives and pushes in the welding pressure of the direction of medial-axis line Y. Since engagement section 4A of an attachment component 4 consists of synthetic resin at this time, the omission prevention section four A2 passes along hole 1B of the cup member 1 with that resiliency, and it projects to the external surface side of the cup member 1. A ball 3 is stuffed into after an appropriate time from opening 4C of an attachment component 4. The one spot bearing which does not become scattering like such an easy assembler is obtained.

[0020] Next, explanation of this one spot bearing of operation is given. For example, if the AKISHIARU load which sways at a certain include angle to the medial-axis line Y of drawing 1 to the outcrop of a ball 3 shall be added, a ball 3 will rotate in the direction in which an AKISHIARU load sways. The corpuscle member 2 supporting this rotation rotates in the direction opposite to the hand of cut of a ball 3, and rolls the inside of the cup member 1 in the direction in which a load sways. Engagement section 4A of an attachment component 4 shakes rightward, when the direction where a load sways in connection with this, for example, an AKISHIARU load, sways on right-hand side. Therefore, when an AKISHIARU load shakes on left-hand side and the AKISHIARU load which joins the outcrop of a ball 3 shakes to the medial-axis line Y after all to a certain include-angle (for example, \*\*15 degrees) right and left since engagement section 4A of an attachment component 4 is rocked leftward similarly, an attachment component 4 will be rocked in this direction. Since interference of corpuscle member 2 comrades is rocked absolutely none at this time, without being interfered with an attachment component 4 by engagement section 4A, a ball 3 rotates with small torque.

[0021] Next, drawing 2 explains the 2nd example of this one spot bearing. Drawing 2 (A) is drawing seen from the upper part, and the (B) is a drawing for explaining a cross section. In drawing 2, a corresponding member shall be shown about the same notation as drawing 1.

[0022] Although hole 1B formed in the part applicable to the base of the cup member 1 is not a round hole but a slot long to an one direction and the shorter side of this slot is only larger than the path of the pillar section four A1 of engagement section 4A a little as this example is shown in drawing 2, that long side has engagement section 4A larger than the path of that pillar section four A1 to extent which can be rocked in the predetermined range.

[0023] Since engagement section 4A of an attachment component 4 rocks only to the longitudinal direction of hole 1B, in order to also regulate rocking of attachment component 4 self only to the longitudinal direction of hole 1B, The internal-surface parts 1C and 1D of the shape of cross-section straight line, i.e., cup which meets these flat outer wall sectionsD [ 4 ] and 4E while making it flat,-like member 1 are also made flat for the parts 4D and 4E in alignment with the longitudinal direction of hole 1B in the external surface of an attachment component 4. In the condition that external force is not added, the flat outer wall sections 4D and 4E of an attachment component 4 and the flat wall sections 1C and 1D of the cup-like member 1 have countered in parallel mostly through few openings. In addition, in this example, it has four corpuscle members 2 at intervals of 90 degrees focusing on the medial-axis line Y, and two corpuscle members 2 are located in those both sides along with the longitudinal direction of hole 1B.

[0024] Therefore, although an attachment component 4 is easily rocked to the longitudinal direction of hole 1B of the cup member 1 by rotation of a ball 3 and the corpuscle member 2 at the one spot bearing of this structure when the AKISHIARU load which sways at a certain include angle to the medial-axis line Y joins the outcrop of a ball 3 Since the flat outer wall sections 4D and 4E of an attachment component 4 and the flat wall sections 1C and 1D of the cup-like member 1 contact when external force is added in the direction of a shorter side of hole 1B of the cup member 1, an attachment component 4 is not rocked in this direction.

[0025] At the one spot bearing of this structure, there is the description of not exercising in the mistaken direction and not answering a noise even if the external force used as a noise may be added, since the direction to rock is regulated.

[0026] Next, drawing 3 explains the example which applied the one spot bearing concerning one example of this invention to electronic intelligence equipment.

[0027] In drawing 3 , 5 is an attaching member in which some carried substrates, such as the light source of electronic intelligence equipment or prism, are shown, carried out fitting of the cup-like member 1 to that installation hole 5A, and has attached this one spot bearing. 6 is in contact with \*\* and the exposed part of a ball 3 by one point with driven members, such as a support plate supporting the mirror for changing the direction of light. Although the driven member 6 is supported at one one spot bearing at drawing 3 , the one spot bearing of the number of arbitration may be arranged in one train at a drawing longitudinal direction if needed, and you may support in the straight line which consists of two or more points of contact. When the AKISHIARU load which shakes within the limits of \*\*15 degrees as opposed to the direction of medial-axis line Y is applied, and the ball 3 of one spot bearing rotates by within the limits which is \*\*15 degrees, the driven member 6 is rocked in the direction of a front flesh side of space within the limits of \*\*15 degrees in drawing 3.

[0028] Since the omission prevention section four A2 of engagement section 4A is prolonged on the external surface of the cup-like member 1 at the one spot bearing of this structure, an attachment component 4 at it The corpuscle member 2 and a ball 3 can rotate, and the driven member 6 can be made to rock easily by combining the driving source (not shown) of the driven member 6 with this omission prevention section four A2, and giving external force to the longitudinal direction of hole 1B of the cup-like member 1.

[0029] In addition, at the one spot bearing of the structure shown in drawing 1 and drawing 3 , it can consider as the pivot bearing of one apparatus to which each part material does not become scattering by fixing a shaft to the crowning of a ball 3.

[0030]

[Effect of the Invention] According to this invention, as stated above, the corpuscle member 2 separates mutually by the attachment component, and is located, and since corpuscle member 2 comrades do not interfere since there is little number, therefore vibration of a proper does not occur, minute vibration is not given to the driven member of electronic information machines and equipment.

[0031] Moreover, it is possible to assemble easily the one spot bearing which stuffs an attachment component 4 into the cup member 1, only stuffs a ball into an attachment component 4 further, and does not become scattering.

[0032] Furthermore, compared with the former, the number of corpuscle members can be lessened sharply, and since an assembly is also easy, the one spot bearing of low cost can be offered.

[0033] Moreover, since the cup member and the free wheel plate are not sealed by welding at this one spot bearing, lubricant like grease can be easily filled up or supplied with oil after an assembly not to mention neither Chile nor a thermal strain arising at the time of welding, and not having a bad influence on an operating characteristic.

[0034] Moreover, the electronic intelligence equipment of high performance using one spot bearing with such a merit can be offered.

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## TECHNICAL FIELD

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[Industrial Application] This invention relates to suitable one spot bearing to change the include angle of the mirror to which the path of the light in the electronic intelligence equipment using various kinds of optical media is changed.

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## PRIOR ART

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[Description of the Prior Art] The development of electronic information machines and equipment using optical media, such as a compact disk (CD) in recently, CD-ROM (lead-on memory), or an optical MAG (MO) disk, is \*\*\*\* better \*\*. If these roughly classify, the electronic information machines and equipment using CD and the laser disc (LD) only for playbacks which stores the information which is not erased, and a fixed period need to be saved, and it will become three kinds of the types of the electronic information machines and equipment using WO (write-once) disk and CD-R (CD recorder bull) for 1 time record repeat playback which stores the information which is not eliminable accidentally, and the electronic information machines and equipment using the MO disk and the mini disc (MD) which can carry out repeat write-in playback.

[0003] Also in which [ these ] electronic information machines and equipment, it has the optical pickup device in which the information stored in each disk is read optically, and this optical pickup device consists of a mirror for scanning the light source like the light emitting diode which generates the light for generally reading the information on a disk optically, or a laser diode, and its beam of light. One spot bearing as shown in drawing 4 is used for the servo DORABU device in which the mirror is driven, as an optical pickup carrier.

[0004] By drawing 4 , if such conventional one spot bearing is explained, many corpuscle members 2 will be mutually contacted at the pars basilaris ossis occipitalis of the semi-sphere-like cup member 1, it will arrange, one quite bigger ball 3 than the path of the corpuscle member 2 will be carried on them, and flange 7A of the cover member 7 will be welded to flange 1A of the cup member 1. The cover member 7 has opening 7B of a circle configuration, and head part 3A of a ball 3 exposes it from opening 7B. Where the mirror which is not illustrated to head part 3A of the ball 3 or the mirror support plate is supported at one spot in the electronic intelligence equipment of a certain kind of optical medium use and a load is covered in the direction Y of AKISHIARU When a ball 3 rotates according to external force within the limits of a fixed include angle (about \*\*15 degrees), the mirror which is in contact with the ball 3 by one point, or a mirror support plate rocks to right and left or order with small torque.

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## EFFECT OF THE INVENTION



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[Effect of the Invention] According to this invention, as stated above, the corpuscle member 2 separates mutually by the attachment component, and is located, and since corpuscle member 2 comrades do not interfere since there is little number, therefore vibration of a proper does not occur, minute vibration is not given to the driven member of electronic information machines and equipment.

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[0032] Furthermore, compared with the former, the number of corpuscle members can be lessened sharply, and since an assembly is also easy, the one spot bearing of low cost can be offered.

[0033] Moreover, since the cup member and the free wheel plate are not sealed by welding at this one spot bearing, lubricant like grease can be easily filled up or supplied with oil after an assembly not to mention neither Chile nor a thermal strain arising at the time of welding, and not having a bad influence on an operating characteristic.

[0034] Moreover, the electronic intelligence equipment of high performance using one spot bearing with such a merit can be offered.

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## TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] However, at one spot bearing with such structure, since vibration of a proper occurs by interference of corpuscle member 2 comrades, there is a fault of giving minute vibration to driven members, such as a mirror member.

[0006] moreover, the effect of Chile which the fixed approach of the cup member 1 and the cover member 7 is difficult, for example, generates in spot welding at the time of welding, and a heart gap -- rocking actuation of one spot bearing -- un-smooth \*\* -- being easy -- \*\* -- there is a problem to say.

[0007] Furthermore, since it changes the cup member 1 and the cover member 7 into the condition near seal, there is also a fault that washing and oil supply after an assembly are difficult.

[0008] While this invention solves such all conventional troubles, an assembly is easily possible and it aims at offering the electronic intelligence equipment using cheap one spot bearing and cheap it.

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## MEANS

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[Means for Solving the Problem] In order to solve the above problems, the 1st invention The cup member of the shape of a semi-sphere which equipped the bottom with the hole mostly, and a pillar section with a path smaller than the path of this hole inserted in the hole of said cup member, The engagement section which consists of the omission prevention section for preventing omission from this hole is the member of the shape of an outside partial ball mostly prolonged from the bottom. The attachment component which has two or more stomata mostly formed in the core at fixed spacing in said engagement section, and has a path smaller than the path of the cup member of the shape of said semi-sphere, It supports to said two or more corpuscle member in the corpuscle member held at two or more stomata of this attachment component, and said attachment component. It consists of a ball member which the part has exposed from opening of the circle configuration of said attachment component, and the one spot bearing characterized by said attachment component and ball member rocking along with the spherical surface of said cup member according to the load concerning said ball is offered.

[0010] In order to solve the above problems, the 2nd invention offers the one spot bearing according to claim 1 characterized by said hole of said cup member being almost circular.

[0011] In order to solve the above problems, the 3rd invention offers the one spot bearing according to claim 1 characterized by being a long hole with said hole of said cup member long to an one direction.

[0012] In order to solve the above problems, the 4th invention offers the one spot bearing according to claim 1 to which the diameter of min of opening of said circle configuration of said ball attachment component is characterized by being smaller than the overall diameter of said said ball.

[0013] In order to solve the above problems, the 5th invention offers the one spot bearing according to claim 1 by which it is forming [ in the part where said ball attachment component and said cup member meet ], respectively-almost flat concurrency part for preventing said ball attachment component turning characterized.

[0014] In order to solve the above problems, the 6th invention offers the electronic intelligence equipment characterized by having the member rocked by actuation of this one spot bearing while having one spot bearing according to claim 1.

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## EXAMPLE

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[The gestalt and example] for inventing A drawing explains each example of this invention below. In drawing 1 (A) which shows the cross section (Rhine X-X') of this one spot bearing, and drawing 1 (B) seen from the cup member bottom, the same notation as the notation shown by drawing 3 shall show a corresponding member.

[0016] While not having a free wheel plate unlike the conventional thing, but replacing with a cover and holding the both sides of a few corpuscle members and one ball by the attachment component, the description of this one spot bearing makes that attachment component engage with hole 1B of the cup member 1, and it is made to rock it.

[0017] The cup member 1 is the thing of the shape of a semi-sphere which consists of a metallic material, and has hole 1B of a circle configuration at the pars basilaris ossis occipitalis. The attachment component 4 which consists of a synthetic-resin ingredient is carrying out the configuration of the shape of a partial ball with an outer diameter smaller than the bore of the cup member 1, and has engagement section 4A prolonged along with the medial-axis line Y from the external surface, and hole 4B for holding the corpuscle member 2. Moreover, an attachment component 4 puts in a ball 3 and has opening 4C a ball does not have dedropping simply after that.

[0018] Engagement section 4A consists of a pillar section four A1 and the omission prevention section four A2 formed at the tip. A pillar section four A1 has die length with it rather than hole 1B of the cup member 1 in extent which can be rocked within hole 1B of a circle configuration. [ than the thickness of the cup member 1 ] [ a small and path and ] [ larger ] The path is large rather than the path of hole 1B of the cup member 1, and once engagement section 4A is fitted in hole 1B of the cup member 1, it escapes from the part of the overall diameter of the omission prevention section four A2 simply by the omission prevention section four A2. Moreover, in order that three hole 4B may hold three corpuscle members 2, it is symmetrical with the medial-axis line Y, and it has it at equal intervals mostly. Although five or more pieces are sufficient as hole 4B and the corpuscle member 2, from the field of cost, three pieces or four pieces are desirable. Moreover, opening 4C is the configuration which has one or more projections which make the part of the narrowest width of face of circular [ desirable / with a path smaller than a ball 3 / a little ], or opening 4C smaller than a ball 3 a little.

[0019] The assembly of this one spot bearing is very easy, is in the condition of having made the corpuscle member 2 holding to three hole 4B of an attachment component 4, respectively, doubles engagement section 4A of an attachment component 4 with hole 1B of the cup member 1, and gives and pushes in the welding pressure of the direction of medial-axis line Y.

Since engagement section 4A of an attachment component 4 consists of synthetic resin at this time, the omission prevention section four A2 passes along hole 1B of the cup member 1 with that resiliency, and it projects to the external surface side of the cup member 1. A ball 3 is stuffed into after an appropriate time from opening 4C of an attachment component 4. The one spot bearing which does not become scattering like such an easy assembler is obtained.

[0020] Next, explanation of this one spot bearing of operation is given. For example, if the AKISHIARU load which sways at a certain include angle to the medial-axis line Y of drawing 1 to the outcrop of a ball 3 shall be added, a ball 3 will rotate in the direction in which an AKISHIARU load sways. The corpuscle member 2 supporting this rotation rotates in the direction opposite to the hand of cut of a ball 3, and rolls the inside of the cup member 1 in the direction in which a load sways. Engagement section 4A of an attachment component 4 shakes rightward, when the direction where a load sways in connection with this, for example, an AKISHIARU load, sways on right-hand side. Therefore, when an AKISHIARU load shakes on left-hand side and the AKISHIARU load which joins the outcrop of a ball 3 shakes to the medial-axis line Y after all to a certain include-angle (for example, \*\*15 degrees) right and left since engagement section 4A of an attachment component 4 is rocked leftward similarly, an attachment component 4 will be rocked in this direction. Since interference of corpuscle member 2 comrades is rocked absolutely none at this time, without being interfered with an attachment component 4 by engagement section 4A, a ball 3 rotates with small torque.

[0021] Next, drawing 2 explains the 2nd example of this one spot bearing. Drawing 2 (A) is drawing seen from the upper part, and the (B) is a drawing for explaining a cross section. In drawing 2, a corresponding member shall be shown about the same notation as drawing 1.

[0022] Although hole 1B formed in the part applicable to the base of the cup member 1 is not a round hole but a slot long to an one direction and the shorter side of this slot is only larger than the path of the pillar section four A1 of engagement section 4A a little as this example is shown in drawing 2, that long side has engagement section 4A larger than the path of that pillar section four A1 to extent which can be rocked in the predetermined range.

[0023] Since engagement section 4A of an attachment component 4 rocks only to the longitudinal direction of hole 1B, in order to also regulate rocking of attachment component 4 self only to the longitudinal direction of hole 1B, The internal-surface parts 1C and 1D of the shape of cross-section straight line, i.e., cup which meets these flat outer wall sectionsD [ 4 ] and 4E while making it flat,-like member 1 are also made flat for the parts 4D and 4E in alignment with the longitudinal direction of hole 1B in the external surface of an attachment component 4. In the condition that external force is not added, the flat outer wall sections 4D and 4E of an attachment component 4 and the flat wall sections 1C and 1D of the cup-like member 1 have countered in parallel mostly through few openings. In addition, in this example,

it has four corpuscle members 2 at intervals of 90 degrees focusing on the medial-axis line Y, and two corpuscle members 2 are located in those both sides along with the longitudinal direction of hole 1B.

[0024] Therefore, although an attachment component 4 is easily rocked to the longitudinal direction of hole 1B of the cup member 1 by rotation of a ball 3 and the corpuscle member 2 at the one spot bearing of this structure when the AKISHIARU load which sways at a certain include angle to the medial-axis line Y joins the outcrop of a ball 3 Since the flat outer wall sections 4D and 4E of an attachment component 4 and the flat wall sections 1C and 1D of the cup-like member 1 contact when external force is added in the direction of a shorter side of hole 1B of the cup member 1, an attachment component 4 is not rocked in this direction.

[0025] At the one spot bearing of this structure, there is the description of not exercising in the mistaken direction and not answering a noise even if the external force used as a noise may be added, since the direction to rock is regulated.

[0026] Next, drawing 3 explains the example which applied the one spot bearing concerning one example of this invention to electronic intelligence equipment.

[0027] In drawing 3 , 5 is an attaching member in which some carried substrates, such as the light source of electronic intelligence equipment or prism, are shown, carried out fitting of the cup-like member 1 to that installation hole 5A, and has attached this one spot bearing. 6 is in contact with \*\* and the exposed part of a ball 3 by one point with driven members, such as a support plate supporting the mirror for changing the direction of light. Although the driven member 6 is supported at one one spot bearing at drawing 3 , the one spot bearing of the number of arbitration may be arranged in one train at a drawing longitudinal direction if needed, and you may support in the straight line which consists of two or more points of contact. When the AKISHIARU load which shakes within the limits of \*\*15 degrees as opposed to the direction of medial-axis line Y is applied, and the ball 3 of one spot bearing rotates by within the limits which is \*\*15 degrees, the driven member 6 is rocked in the direction of a front flesh side of space within the limits of \*\*15 degrees in drawing 3.

[0028] Since the omission prevention section four A2 of engagement section 4A is prolonged on the external surface of the cup-like member 1 at the one spot bearing of this structure, an attachment component 4 at it The corpuscle member 2 and a ball 3 can rotate, and the driven member 6 can be made to rock easily by combining the driving source (not shown) of the driven member 6 with this omission prevention section four A2, and giving external force to the longitudinal direction of hole 1B of the cup-like member 1.

[0029] In addition, at the one spot bearing of the structure shown in drawing 1 and drawing 3 , it can consider as the pivot bearing of one apparatus to which each part material does not become scattering by fixing a shaft to the crowning of a ball 3.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the 1st example of the one spot bearing concerning this invention.

[Drawing 2] It is drawing showing the 2nd example of the one spot bearing concerning this invention.

[Drawing 3] It is drawing for explaining the electronic intelligence equipment using the one spot bearing concerning this invention.

[Drawing 4] It is drawing showing an example of the conventional one spot bearing.

[Description of Notations]

1 .... Cup member

1A .... Flange of a cup member

1B .... Hole established in the pars basilaris ossis occipitalis of a cup member

1C, 1D .... The flat wall section of a cup member

2 .... Two or more corpuscle members

3 .... Ball

4 .... Attachment component

4A .... The engagement section of an attachment component

Four A1 .... Pillar section of the engagement section

Four A2 .... The omission prevention section of the engagement section

4B .... Two or more holes for holding the corpuscle member 2

4C .... Opening for holding Ball 3 to an attachment component

4E, 4D .... The flat outer wall section of an attachment component

5 .... Attaching member

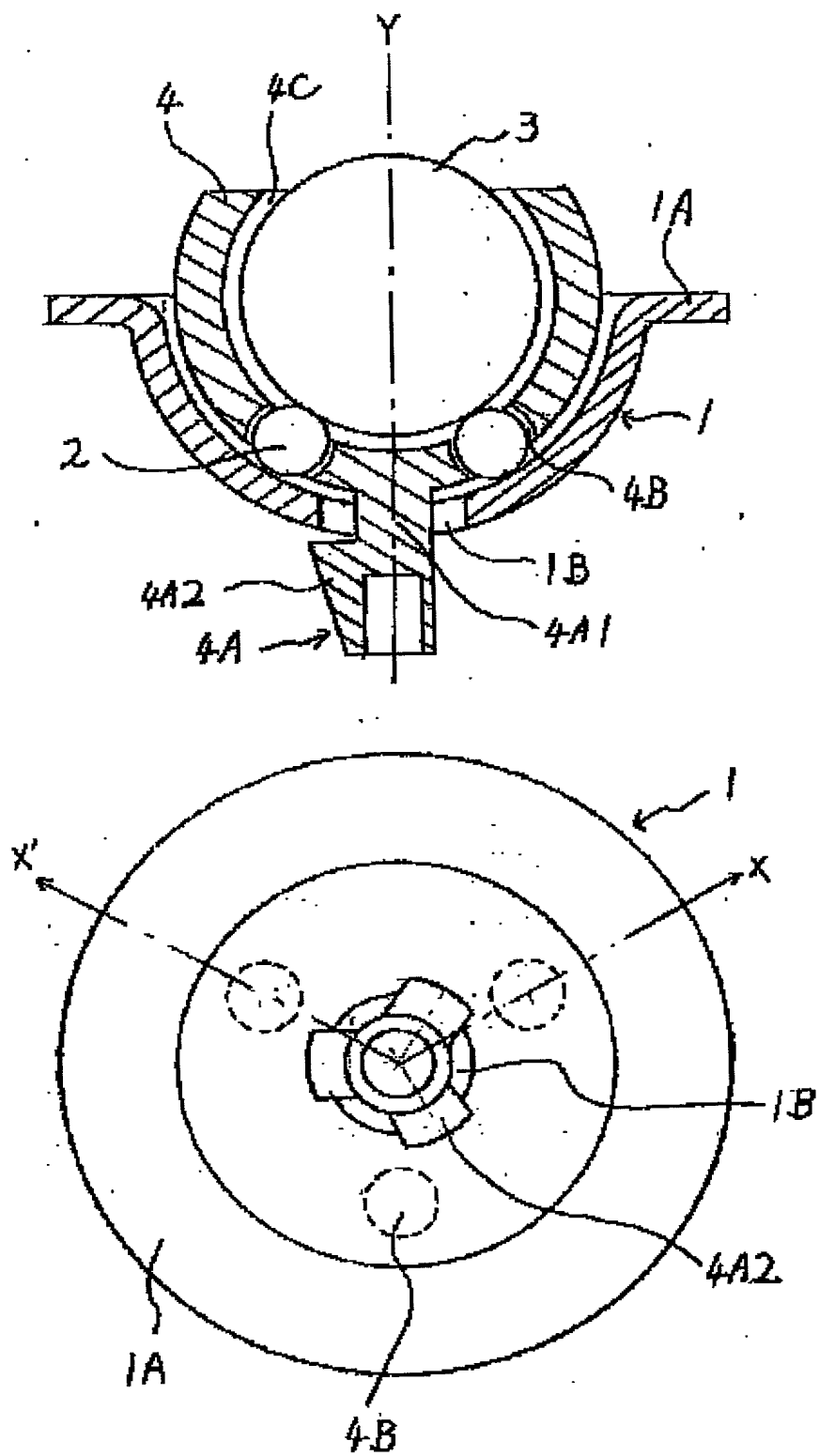
6 .... Driven member

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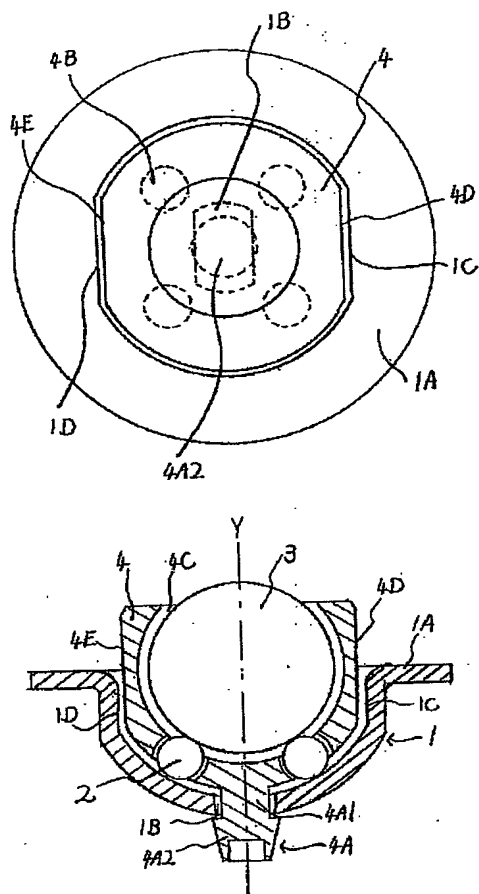
## DRAWINGS

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[Drawing 1]

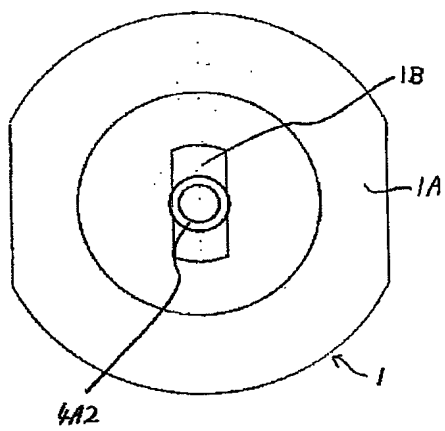
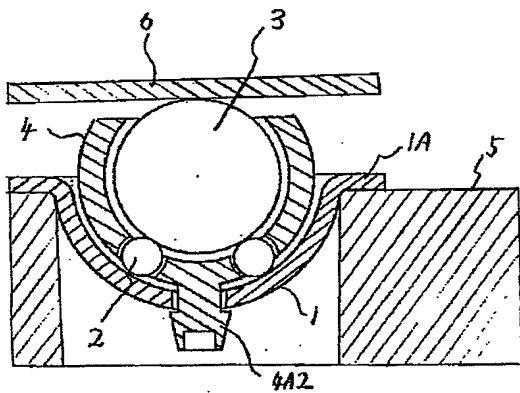


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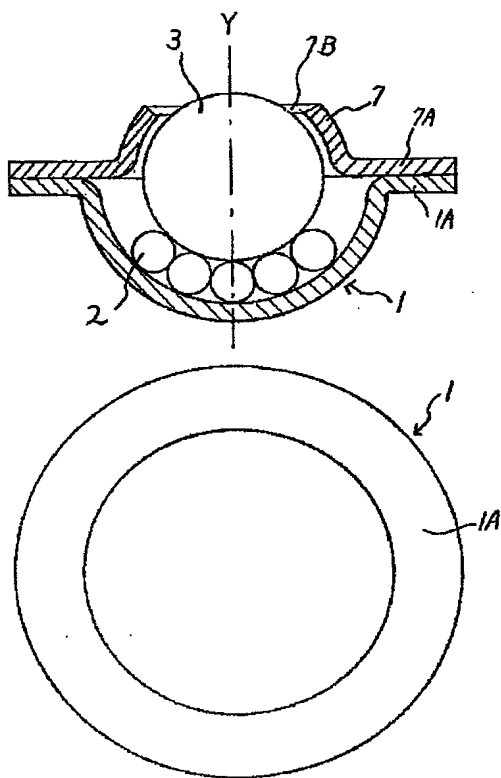


[Drawing 3]





[Drawing 4]




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WRITTEN AMENDMENT

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----- [a procedure revision]

[Filing Date] March 5, Heisei 8

[Procedure amendment 1]

[Document to be Amended] Specification

[Item(s) to be Amended] The name of invention

[Method of Amendment] Modification

[Proposed Amendment]

[Title of the Invention] One spot bearing and electronic intelligence equipment using it

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平9-166135

(43) 公開日 平成9年(1997)6月24日

(51) Int.Cl.<sup>5</sup>

F 1 6 C 19/50

識別記号

庁内整理番号

F I

F 1 6 C 19/50

技術表示箇所

審査請求 未請求 請求項の数6 F D (全 6 頁)

(21) 出願番号

特願平7-347976

(22) 出願日

平成7年(1995)12月15日

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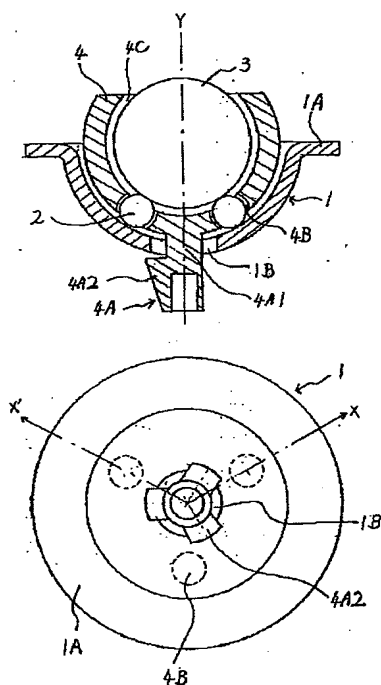
東京都豊島区高田1丁目18番1号 オリジ  
ン電気株式会社内

(54) 【発明の名称】 ワンポイントベアリング及びそれを用いた電子情報装置

(57) 【要約】

【目的】 固有振動を生ずることなく、組み立てが簡単で安価なワンポイントベアリングを提供すること。

【構成】 ほぼ最下部に穴を備えた半球状のカップ部材1と、カップ部材1の穴1Bに挿入されるその穴の径よりも径の小さい柱部4A1と、穴1Bからの脱落を防ぐための脱落防止部4A2とからなる係着部4Aが外面のほぼ最下部から延びる部分球状の部材であって、係着部4Aをほぼ中心にほぼ一定間隔で形成された複数の孔4Bを持ち、カップ部材1の径よりも小さな径を有する保持部材4と、この保持部材4の複数の小孔に保持される小球部材2と、保持部材4内において複数小球部材2に支えられ、保持部材4の円形状の開口から一部分が露出しているボール部材3とからなり、ボール3にかかる外力によって保持部材4とボール部材3がカップ部材1の球面に沿って揺動することを特徴とするワンポイントベアリング及びそれを用いた電子情報装置。



## 【特許請求の範囲】

【請求項 1】 ほぼ最下部に穴を備えた半球状のカップ部材と、

前記カップ部材の穴に挿入される該穴の径よりも径の小さい柱部と、該穴からの脱落を防ぐための脱落防止部とからなる係着部が外面のほぼ最下部から延びる部分球状の部材であって、前記係着部をほぼ中心にほぼ一定間隔で形成された複数の小孔を持ち、前記カップ部材の径よりも小さな径を有する保持部材と、  
該保持部材の複数の小孔に保持される小球部材と、  
前記保持部材内において前記複数の小球部材に支えられ、前記保持部材の円形状の開口から一部分が露出しているボール部材と、からなり、前記ボールにかかる荷重によって前記保持部材とボール部材が前記カップ部材の球面に沿って揺動することを特徴とするワンポイントベアリング。

【請求項 2】 前記カップ部材の前記穴がほぼ円形であることを特徴とする請求項 1 に記載のワンポイントベアリング。

【請求項 3】 前記カップ部材の前記穴が一方に長い長孔であることを特徴とする請求項 1 に記載のワンポイントベアリング。

【請求項 4】 前記保持部材の前記円形状の開口の最小径が、前記前記ボールの最大径よりも小さいことを特徴とする請求項 1 に記載のワンポイントベアリング。

【請求項 5】 前記保持部材が回るのを防ぐためのほぼ平坦な並行部分を、前記保持部材と前記カップ部材の対面する箇所にそれぞれ形成したこと特徴とする請求項 1 に記載のワンポイントベアリング。

【請求項 6】 請求項 1 に記載のワンポイントベアリングを備えると共に、このワンポイントベアリングの動作により揺動する部材を備えたことを特徴とする電子情報装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は、各種の光学媒体を利用した電子情報装置における光の通路を変化させるミラーの角度を変更するのに好適なワンポイントベアリングに関する。

## 【0002】

【従来の技術】 最近におけるコンパクトディスク（CD）、CD-ROM（リードオンメモリ）、又は光磁気（MO）ディスクなどの光学媒体を利用した電子情報機器の発展は目ざましい。これらを大きく分類すると、消すことの無い情報を格納する再生専用の CD やレーザーディスク（LD）を用いる電子情報機器、一定期間の保存が必要で誤って消去できない情報を格納する 1 回記録繰り返し再生用の WO（ライトワンス）ディスクや CD-R（CD レコーダブル）を用いる電子情報機器、及び繰り返し書き込み再生できる MO ディスクやミニディス

ク（MD）を用いる電子情報機器の 3 種類のタイプになる。

【0003】 これらいずれの電子情報機器においても、各ディスクに格納された情報を光学的に読み取る光学ピックアップ機構を備えており、この光学ピックアップ機構は、一般にディスクの情報を光学的に読み取るための光を発生する発光ダイオード又はレーザーダイオードのような光源、及びその光線を走査するためのミラーからなる。そのミラーを駆動するサーボドラブ機構には、光学ピックアップキャリアとして、図 4 に示すようなワンポイントベアリングが用いられている。

【0004】 図 4 により、このような従来のワンポイントベアリングを説明すると、半球状のカップ部材 1 の底部に多数の小球部材 2 を互いに接触させて配置し、それらの上に小球部材 2 の径よりもかなり大きなボール 3 を 1 個載せ、カップ部材 1 のフランジ部 1 A にふた部材 7 のフランジ部 7 A を溶接している。ふた部材 7 は円形状の開口 7 B を有し、その開口 7 B からボール 3 の頭部分 3 A が露出する。ある種の光学媒体利用の電子情報装置では、そのボール 3 の頭部分 3 A に図示しないミラー、あるいはミラー支持板がワンポイントで支持されており、アキシャル方向 Y に負荷をかけた状態で、ボール 3 が外力により一定角度（±15° 程度）の範囲内で回転することにより、そのボール 3 に 1 点で接しているミラー、あるいはミラー支持板が小さなトルクで左右又は前後に揺動するようになっている。

## 【0005】

【発明が解決しようとする課題】 しかし、このような構造をもつワンポイントベアリングでは、小球部材 2 同士の干渉により固有の振動が発生するため、ミラー部材などの被駆動部材に微小振動を与えてしまうという欠点がある。

【0006】 また、カップ部材 1 とふた部材 7 との固定方法が難しく、例えばスポット溶接では溶接時に発生するチリ、芯ずれの影響によって、ワンポイントベアリングの揺動動作が不円滑になり易いという問題がある。

【0007】 さらに、カップ部材 1 とふた部材 7 とが密封に近い状態にされるために、組み立て後の洗浄や給油が難しいという欠点もある。

【0008】 本発明はこのような従来の問題点をすべて解決すると共に、容易に組み立てが可能で、安価なワンポイントベアリング及びそれを用いた電子情報装置を提供することを目的としている。

## 【0009】

【問題を解決するための手段】 前述のような問題を解決するため、第 1 の発明は、ほぼ最下部に穴を備えた半球状のカップ部材と、前記カップ部材の穴に挿入されるこの穴の径よりも径の小さい柱部と、この穴からの脱落を防ぐための脱落防止部とからなる係着部が外面のほぼ最下部から延びる部分球状の部材であって、前記係着部

をほぼ中心にほぼ一定間隔で形成された複数の小孔を持ち、前記半球状のカップ部材の径よりも小さな径を有する保持部材と、この保持部材の複数の小孔に保持される小球部材と、前記保持部材内において前記複数小球部材に支えられ、前記保持部材の円形状の開口から一部分が露出しているボール部材とからなり、前記ボールにかかる荷重によって前記保持部材とボール部材が前記カップ部材の球面に沿って揺動することを特徴とするワンポイントベアリングを提供するものである。

【0010】 前述のような問題を解決するため、第2の発明は、前記カップ部材の前記穴がほぼ円形であることを特徴とする請求項1に記載のワンポイントベアリングを提供するものである。

【0011】 前述のような問題を解決するため、第3の発明は、前記カップ部材の前記穴が一方方向に長い長孔であることを特徴とする請求項1に記載のワンポイントベアリングを提供するものである。

【0012】 前述のような問題を解決するため、第4の発明は、前記ボール保持部材の前記円形状の開口の最小径が前記前記ボールの最大径よりも小さいことを特徴とする請求項1に記載のワンポイントベアリングを提供するものである。

【0013】 前述のような問題を解決するため、第5の発明は、前記ボール保持部材が回るのを防ぐためのほぼ平坦な並行部分を、前記ボール保持部材と前記カップ部材の対面する箇所にそれぞれ形成したこと特徴とする請求項1に記載のワンポイントベアリングを提供するものである。

【0014】 前述のような問題を解決するため、第6の発明は、請求項1に記載のワンポイントベアリングを備えると共に、このワンポイントベアリングの動作により揺動する部材を備えたことを特徴とする電子情報装置を提供するものである。

【0015】

【発明を実施するための形態及び実施例】 以下図面により本発明の各実施例について説明する。このワンポイントベアリングの断面（ラインX-X'）を示す図1

(A)、カップ部材の下側から見た図1(B)において、図3で示した記号と同一の記号は相当する部材を示すものとする。

【0016】 このワンポイントベアリングの特徴は、従来のものとは違ってフタを持たず、ふたに代えて保持部材によって数少ない小球部材と1個のボールの双方を保持すると共に、カップ部材1の穴1Bにその保持部材に係着させて揺動するようにしたものである。

【0017】 カップ部材1は金属材料からなる半球状のものであり、その底部に円形状の穴1Bを有する。合成樹脂材料からなる保持部材4はカップ部材1の内径よりも小さい外径をもつ部分球状の形状をしており、その外面から中心軸線Yに沿って延びる係着部4Aと、小球

部材2を保持するための孔4Bとを有する。また、保持部材4はボール3を入れ、その後ボールが簡単に脱落しないような開口4Cを有する。

【0018】 係着部4Aは柱部4A1とその先端に形成された脱落防止部4A2とからなる。柱部4A1は円形状の穴1B内で揺動できる程度にカップ部材1の穴1Bよりも径が小さく、かつカップ部材1の厚みよりも大きい長さを有する。脱落防止部4A2の最大径の部分はカップ部材1の穴1Bの径よりも径が大きくなっており、係着部4Aが一旦、カップ部材1の穴1Bに嵌挿された後には、脱落防止部4A2により簡単には抜けないようになっている。また、3個の孔4Bは3個の小球部材2を保持するため、中心軸線Yに対称でほぼ等間隔に備えられている。孔4B及び小球部材2は5個以上でも良いが、コストの面からは3個又は4個が好ましい。また、開口4Cは好ましくはボール3よりも径が若干小さい円形、又は開口4Cの最も狭い幅の部分をボール3よりも若干小さくするような一つ以上の突起を有するような形状である。

【0019】 このワンポイントベアリングの組み立ては非常に容易であり、保持部材4の3個の孔4Bにそれぞれ小球部材2を保持させた状態で、保持部材4の係着部4Aをカップ部材1の穴1Bに合わせ、中心軸線Y方向の加圧力を与えて押し込む。このとき、保持部材4の係着部4Aは合成樹脂からなるので、その弾力性により脱落防止部4A2がカップ部材1の穴1Bを通して、カップ部材1の外面側に突き出る。しかる後にボール3を保持部材4の開口4Cから押し込む。このような簡単な組み立て工程によってバラバラになることの無いワンポイントベアリングが得られる。

【0020】 次にこのワンポイントベアリングの動作説明を行う。例えば、ボール3の露出部に図1の中心軸線Yに対してある角度で振れるアキシャル荷重が加わるものとする、ボール3はアキシャル荷重が振れる方向に回転する。この回転を支える小球部材2はボール3の回転方向とは反対の方向に回転を行い、カップ部材1の内面を荷重の振れる方向に転動する。これに伴い、保持部材4の係着部4Aは荷重が振れる方向、例えばアキシャル荷重が右側に振れるときには、右方向に揺れる。したがって、アキシャル荷重が左側に揺れるときには、同様に保持部材4の係着部4Aは左方向に揺動するので、結局、ボール3の露出部に加わるアキシャル荷重が中心軸線Yに対してある角度（例えば、 $\pm 15^\circ$ ）左右に揺れると、保持部材4は同方向に揺動することになる。このとき、小球部材2同士の干渉は一切なく、保持部材4が係着部4Aによって邪魔されることなく揺動するため、ボール3は小さいトルクで回転を行う。

【0021】 次に、図2によりこのワンポイントベアリングの第2の実施例を説明する。図2(A)は上方から見た図であり、その(B)は断面を説明するための図

面である。図2において、図1と同一の記号については相当する部材を示すものとする。

【0022】 この実施例は図2に示すように、カップ部材1の底面に該当する部分に形成された穴1Bが丸穴ではなく一方に長い長穴であり、この長穴の短辺は係着部4Aの柱部4A1の径より若干大きいだけであるが、その長辺は係着部4Aが所定の範囲で揺動できる程度にその柱部4A1の径よりも大きい。

【0023】 保持部材4の係着部4Aが穴1Bの長手方向だけに揺動するので、保持部材4自身の揺動も穴1Bの長手方向だけに規制するため、保持部材4の外面上における穴1Bの長手方向に沿った部分4D、4Eを断面直線状、つまり平坦にすると共に、これら平坦外壁部4D、4Eに対面するカップ状部材1の内壁面部分1C、1Dをも平坦にしている。外力が加わっていない状態では、保持部材4の平坦外壁部4D、4Eとカップ状部材1の平坦内壁部1C、1Dは僅かな空隙を介してほぼ並行に対向している。なお、この実施例では中心軸線Yを中心に90°間隔で小球部材2を4個備えており、穴1Bの長手方向に沿ってその両側に2個の小球部材2を位置させている。

【0024】 したがって、この構造のワンポイントベアリングでは、中心軸線Yに対してある角度で振れるアキシャル荷重がボール3の露出部に加わるとき、ボール3及び小球部材2の回転により保持部材4はカップ部材1の穴1Bの長手方向に容易に揺動するが、外力がカップ部材1の穴1Bの短辺方向に加わるときには、保持部材4の平坦外壁部4D、4Eとカップ状部材1の平坦内壁部1C、1Dとが当接するので、保持部材4はこの方向には揺動しない。

【0025】 この構造のワンポイントベアリングでは、揺動する方向が規制されているので、ノイズとなる外力が加わることがあっても、誤った方向に運動することがなく、ノイズにตอบสนองしないという特徴がある。

【0026】 次に本発明の一実施例に係るワンポイントベアリングを電子情報装置に適用した実施例を図3により説明する。

【0027】 図3において、5は電子情報装置の光源又はプリズムなどの搭載された基板の一部分を示す取り付け部材であり、その取り付け穴5Aにカップ状部材1を嵌合させてこのワンポイントベアリングを取り付けている。6は光の方向を変化させるためのミラーを支える支持板などのような被駆動部材であり、ボール3の露出部分に1点で接している。図3では1個のワンポイントベアリングで被駆動部材6を支えているが、必要に応じて任意の個数のワンポイントベアリングを図面左右方向に1列に配置して、複数の接触点からなる直線で支えても良い。中心軸線Y方向に対して例えば±15°の範囲内で揺れるアキシャル荷重をかけた場合には、ワンポイントベアリングのボール3が±15°の範囲内で回転する

ことにより、被駆動部材6は、図3において±15°の範囲内で紙面の表裏方向に揺動する。

【0028】 この構造のワンポイントベアリングでは、カップ状部材1の外面に保持部材4が係着部4Aの脱落防止部4A2が延びているので、この脱落防止部4A2に被駆動部材6の駆動源（図示せず）を結合して、カップ状部材1の穴1Bの長手方向に外力を与えることにより、小球部材2及びボール3が回転し、被駆動部材6を容易に揺動させることができる。

【0029】 なお、図1及び図3に示した構造のワンポイントベアリングでは、ボール3の頂部にシャフトを固定することにより、各部材がバラバラになることがない一体型のピボットベアリングとすることができる。

#### 【0030】

【発明の効果】 以上述べたように、本発明によれば、小球部材2が保持部材により互いに離れて位置し、個数が少ないので、小球部材2同士が干渉することがなく、したがって固有の振動が発生しないので、電子情報機器の被駆動部材に微小振動を与えてしまうこともない。

【0031】 また、カップ部材1に保持部材4を押し込み、さらに保持部材4にボールを押し込むだけで、バラバラにならないワンポイントベアリングを容易に組み立てることが可能である。

【0032】 さらに、従来に比べて小球部材の数を大幅に少なくでき、組み立ても容易であることから、低コストのワンポイントベアリングを提供できる。

【0033】 また、このワンポイントベアリングではカップ部材とフタを溶接で密閉していないので、溶接時にチリや熱的ひずみなどが生ずることがなく、動作特性に悪影響を与えないのは勿論のこと、組み立て後にグリースのような潤滑剤を容易に充填、あるいは給油することができる。

【0034】 また、このようなメリットをもつワンポイントベアリングを用いた高性能の電子情報装置を提供することができる。

#### 【図面の簡単な説明】

【図1】 本発明に係るワンポイントベアリングの第1の実施例を示す図である。

【図2】 本発明に係るワンポイントベアリングの第2の実施例を示す図である。

【図3】 本発明に係るワンポイントベアリングを用いた電子情報装置を説明するための図である。

【図4】 従来のワンポイントベアリングの一例を示す図である。

#### 【符号の説明】

- 1・・・カップ部材
- 1A・・・カップ部材のフランジ部
- 1B・・・カップ部材の底部に設けられた穴
- 1C、1D・・・カップ部材の平坦内壁部
- 2・・・複数の小球部材

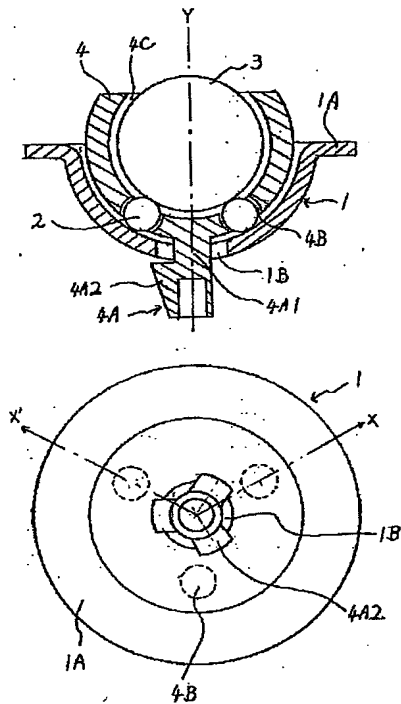
(5)

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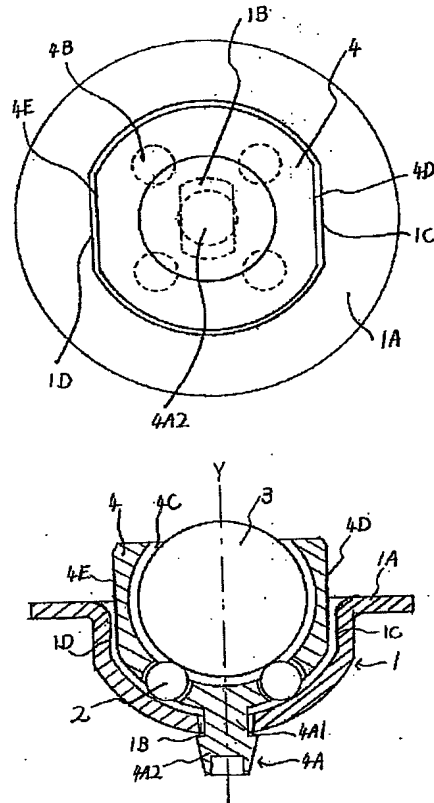
- 3 . . . . . ボール  
 4 . . . . . 保持部材  
 4 A . . . . . 保持部材の係着部  
 4 A 1 . . . . . 係着部の柱部  
 4 A 2 . . . . . 係着部の脱落防止部

- \* 4 B . . . . . 小球部材 2 を保持するための複数の孔  
 4 C . . . . . ボール 3 を保持部材に保持するための開口  
 4 E、4 D . . . . . 保持部材の平坦外壁部  
 5 . . . . . 取り付け部材  
 \* 6 . . . . . 被駆動部材

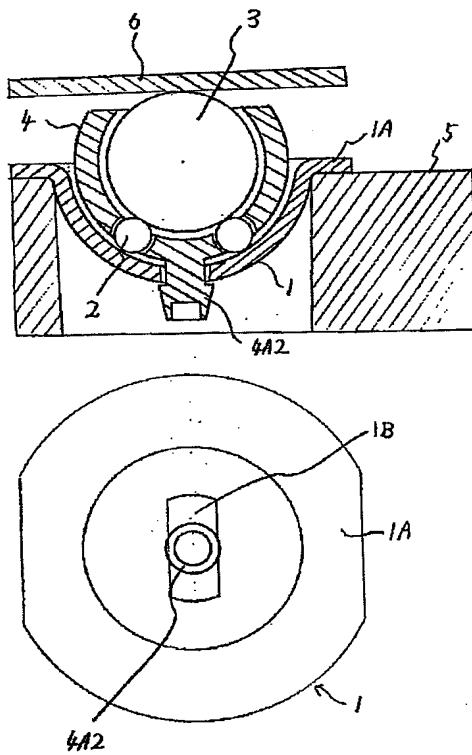
【図 1】



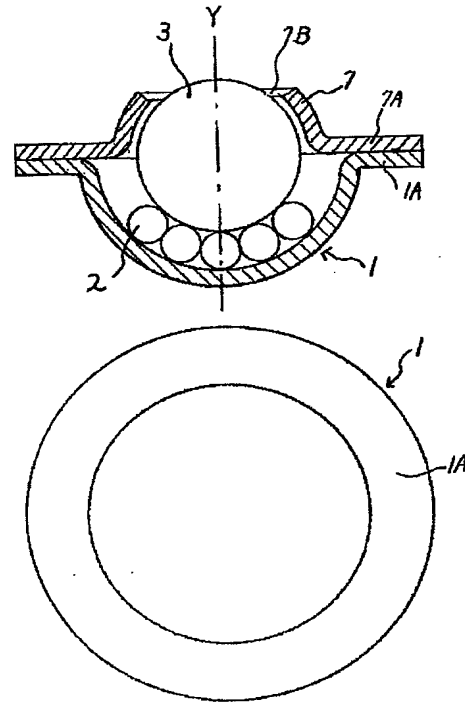
【図 2】



【図3】



【図4】



【手続補正書】

【提出日】平成8年3月5日

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】発明の名称

【補正方法】変更

【補正内容】

【発明の名称】 ワンポイントベアリング及びそれを用いた電子情報装置